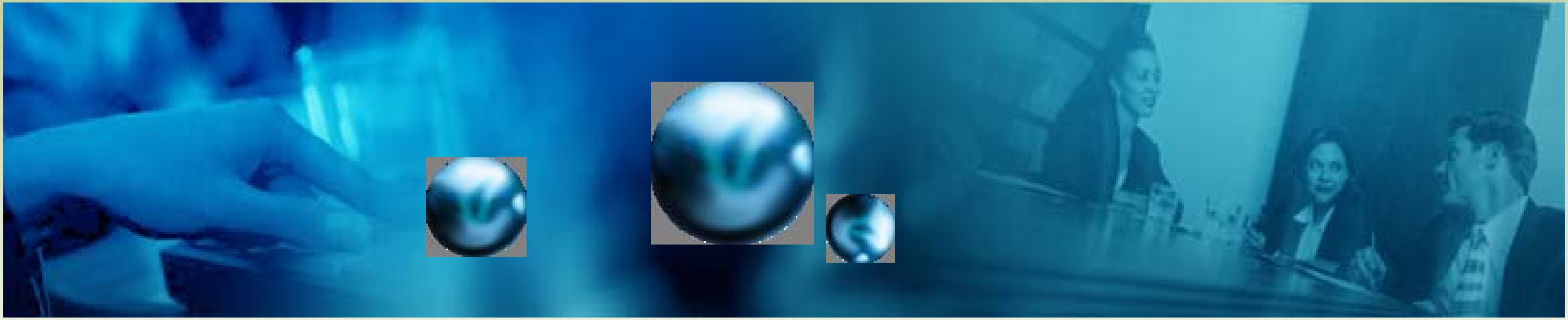


Service Oriented Architecture and Identity Management & Authentication

California Enterprise Architecture Program

February 9, 2006

Introduction

California Enterprise Architecture

- What is CEAP?
- Why SOA / Identity
- Relation to the IT Strategic Plan

SOA

Lee Macklin

What is SOA

- Open, web-based architecture
- Platform & language independent
- XML message based
- Highly interoperable
- Location transparency
- Many security features
- Wide vendor support
- Direct support for business services
- More than Web Services
    - SOA provides the application and integration infrastructure for a web services-based environment

California SOA Goals

- Provide the blueprint for a service oriented architecture that supports California business services and incorporates Identity concepts.
- Provide a key set of SOA principles.
- Ensure SOA fits into the California Enterprise Architecture model.
- Establish a California SOA Center of Excellence to provide SOA leadership, governance, and management of SOA components.

California SOA Principles

1. Design for ease of use
2. Design web services with appropriate granularity
3. Reassemble before Rewrite
4. Design loosely coupled web services
5. Web services must have well defined interfaces
6. Design stateless base web services

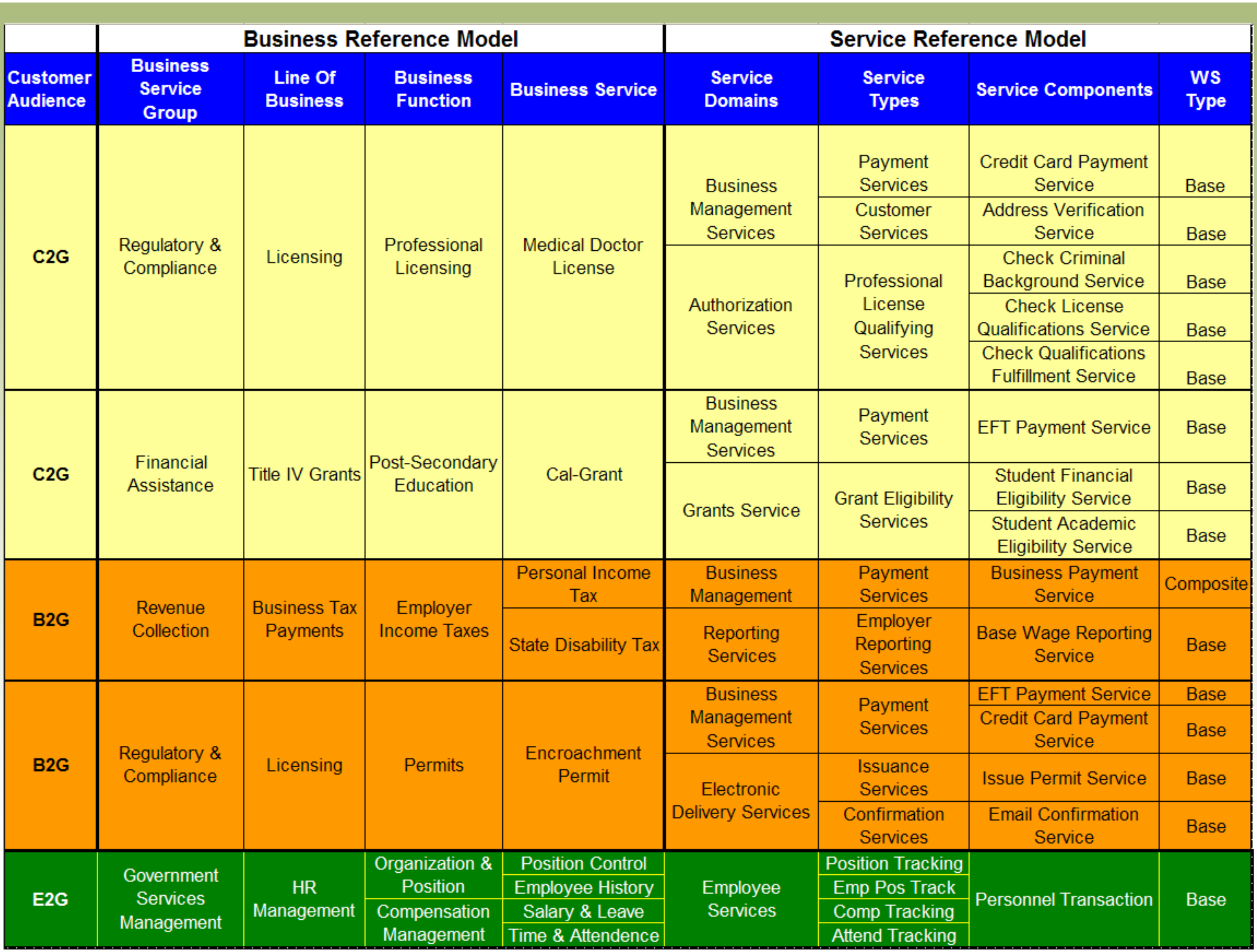
   (doesn't require knowledge of actions taken by a different web service)

California SOA Principles

7. Implement business processes via orchestrating web services
8. Governance & funding structures must be created to manage web service development, deployment and operational environments
9. Implement web services security and policy enforcement standards
10. Provide for transaction failures

    (design services so all transaction items either succeed or rollback)

BRM and SRM Example



	Business Reference Model				Service Reference Model			
Customer Audience	Business Service Group	Line Of Business	Business Function	Business Service	Service Domains	Service Types	Service Components	WS Type
C2G	Regulatory & Compliance	Licensing	Professional Licensing	Medical Doctor License	Business Management Services	Payment Services	Credit Card Payment Service	Base
						Customer Services	Address Verification Service	Base
					Authorization Services	Professional License Qualifying Services	Check Criminal Background Service	Base
							Check License Qualifications Service	Base
							Check Qualifications Fulfillment Service	Base
C2G	Financial Assistance	Title IV Grants	Post-Secondary Education	Cal-Grant	Business Management Services	Payment Services	EFT Payment Service	Base
					Grants Service	Grant Eligibility Services	Student Financial Eligibility Service	Base
							Student Academic Eligibility Service	Base
B2G	Revenue Collection	Business Tax Payments	Employer Income Taxes	Personal Income Tax	Business Management	Payment Services	Business Payment Service	Composite
				State Disability Tax	Reporting Services	Employer Reporting Services	Base Wage Reporting Service	Base
B2G	Regulatory & Compliance	Licensing	Permits	Encroachment Permit	Business Management Services	Payment Services	EFT Payment Service	Base
							Credit Card Payment Service	Base
					Electronic Delivery Services	Issuance Services	Issue Permit Service	Base
						Confirmation Services	Email Confirmation Service	Base
E2G	Government Services Management	HR Management	Organization & Position	Position Control	Employee Services	Position Tracking	Personnel Transaction	Base
				Employee History		Emp Pos Track		
			Compensation Management	Salary & Leave		Comp Tracking		
				Time & Attendence		Attend Tracking		

Governance

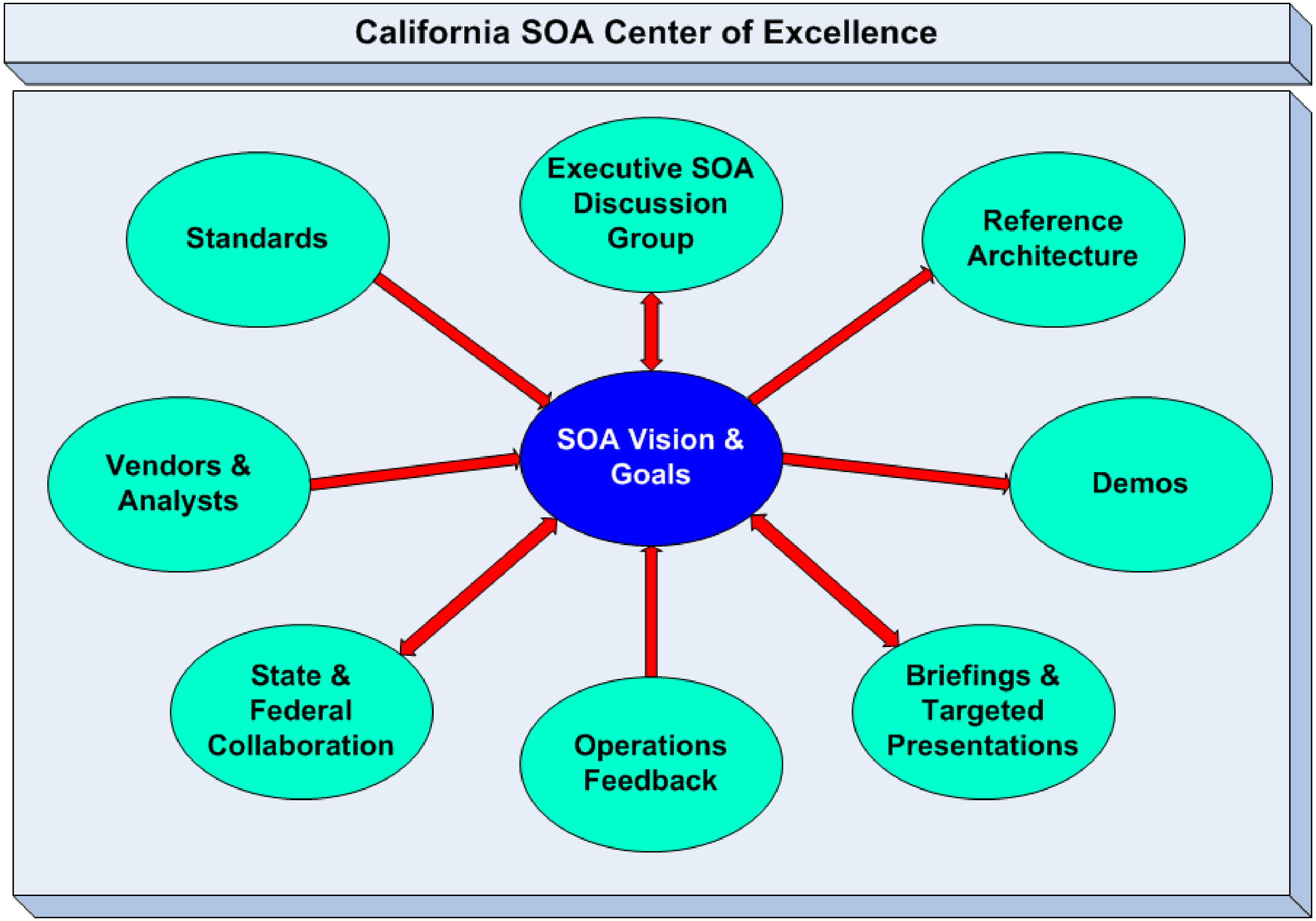
Enterprise Issues

- How will shared services be governed?
- How will shared services be funded?
- How will shared service components be mapped to business services?
- How will component versioning and release packaging be controlled?
- How will components be certified?
- How will component usage be inventoried and tracked?
- How will enterprise troubleshooting be handled?
- How will developers be supported?

Enterprise Issues

- How will components be tested for performance, availability, scalability?
- How will developers locate code for an existing service?
- How will enterprise components be promoted and marketed?
- Will there be a centralized SOA help desk?
- How will business and technical architects determine which components already exist?
- Will there be demo applications?
- Will there be a state-wide search service using a common language?

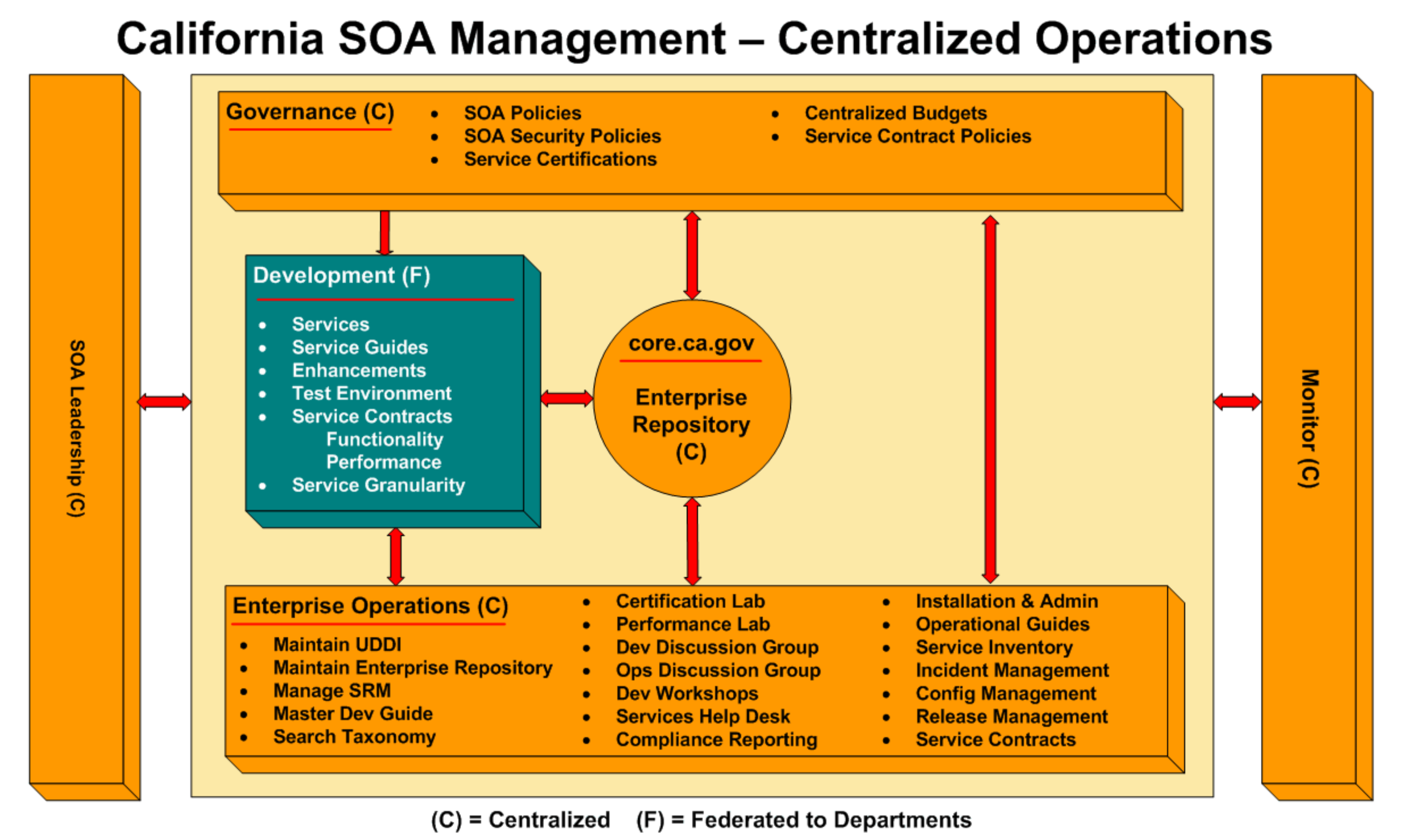
SOA Excellence Model


California SOA Center of Excellence
Standards
Executive SOA Discussion Group
Reference Architecture
Vendors & Analysts
SOA Vision & Goals
Demos
State & Federal Collaboration
Operations Feedback
Briefings & Targeted Presentations

Centralized vs Federated

- A successful state-wide SOA program will require both centralized and federated components
- Singular vision & goals, governance, enterprise repository management, and many operational functions should be **centralized**
- Service development should be **federated** to the producing departments.

Centralized Operations Model



California SOA Management – Centralized Operations

SOA Leadership (C)

Governance (C)

- SOA Policies
- SOA Security Policies
- Service Certifications
- Centralized Budgets
- Service Contract Policies

Development (F)

- Services
- Service Guides
- Enhancements
- Test Environment
- Service Contracts
  Functionality
  Performance
- Service Granularity

core.ca.gov

Enterprise Repository (C)

Enterprise Operations (C)

- Maintain UDDI
- Maintain Enterprise Repository
- Manage SRM
- Master Dev Guide
- Search Taxonomy
- Certification Lab
- Performance Lab
- Dev Discussion Group
- Ops Discussion Group
- Dev Workshops
- Services Help Desk
- Compliance Reporting
- Installation & Admin
- Operational Guides
- Service Inventory
- Incident Management
- Config Management
- Release Management
- Service Contracts

Monitor (C)

(C) = Centralized (F) = Federated to Departments

Why is Governance Important

- Minimizes “service chaos”
- Provides uniform service development and deployment
- Enforces standards
- Enforces consistent security policies
- Reduces overall IT cost
- Provides inventory of services
- Resolves shared services and enterprise services funding issues

Architecture

Web Services

- A service in SOA is an application function packaged as a **reusable** component for use in a business process.
- Web Services stress **interoperability** and **location transparency**. (XML/HTTP/SOAP/WSDL/UDDI)
- Web Services are **language agnostic** and **platform independent**. (XML interfaces)
- Web Services use web based messaging:
  - SOAP/HTTP (WSDL)
  - HTTP-GET (REST)
  - HTTP-POST
- Web Services directly support Business Services
  - Service Reference Model & Business Reference Model

Web Service Types

- Base Web Service (fine-grained)
  - Stateless, encapsulated information
  - Examples: Address Verification, Credit Card Payment
- Composite Web Service (course grained)
  - Stateful, orchestration of base services
  - Implement complex business processes
  - Usually implemented in BPEL (industry standard for web services process flow)
  - Examples: Payment, Professional License, Business Permit
- REST (HTTP-Get)
  - Everything in the URL (no SOAP or WSDL)
  - http://api.local.yahoo.com/LocalSearchService/V1/localSearch?appid=YahooDemo&query=pizza&zip=95661&results=2
    - Returns first two pizza places found in Roseville, CA

SOAP (XML Document)

- Simple Object Access Protocol
- A simple XML based protocol to let applications exchange information over HTTP
- SOAP is a protocol for accessing a Web Service

WSDL (XML Document)

- Web Service Definition Language
  - Interface
    - Web Methods (service actions)
  - Service
    - Name, Description, Namespace
    - Location (service URL)
  - WSDL can be placed in a UDDI repository
    - Public directory of available services
  - Interface Only vs Deployment documents

Standards - General

- Organizations
  - W3C
  - OASIS
- SOAP, XML, WSDL, UDDI
- WSIL (Web Services Inspection Language)
  - May replace UDDI
- WSRP (Web Services for Remote Portlets)
  - Descriptive GUI
- WS-Reliability, WS-ReliableMessaging

Standards - Process

- BPEL (Business Process Execution Language)
  - OASIS - IBM, Microsoft, BEA
- WSCL (Web Services Conversation Language)
  - HP
- WSCI (Web Services Choreography Interface)
  - BEA, Sun, SAP
- BPML (Business Process Markup Language)
  - W3C
- BPSS (Business Process Specifications Schema)
  - ebXML
- WSFL (Web Services Flow Language)
  - IBM
- XLANG

Standards - Transaction

- WS-Transaction
- WS-Coordination
    - Atomic
    - Business Activity (long running)

Reference Enterprise Architecture

- Set architecture direction
- Browser-based applications
- Web services based
- Common components
  - Business rules engine
  - Enterprise services
  - Shared services
  - Directory services
- Three platforms
  - .NET
  - J2EE
  - Mainframe
- Application & Services Integration

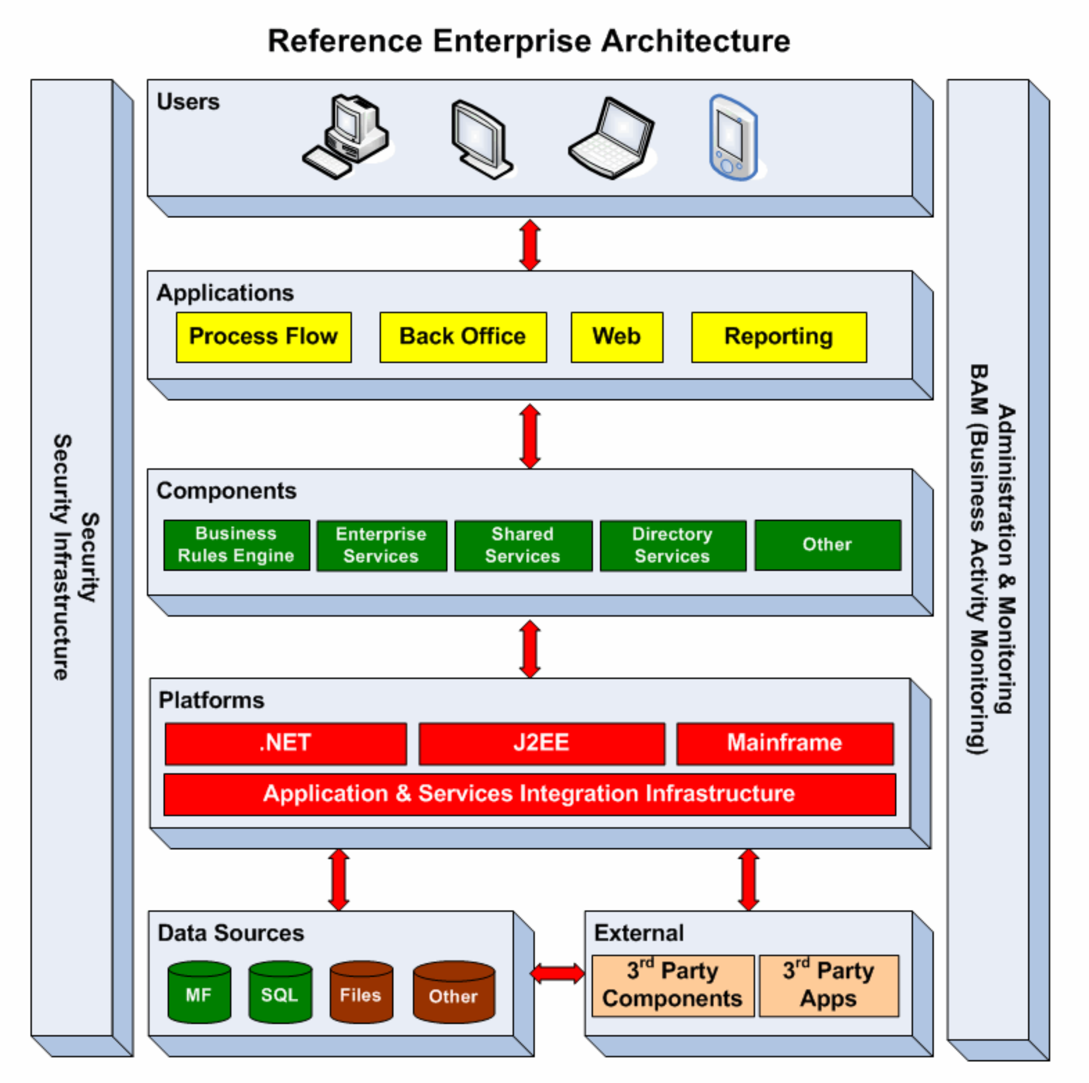
Ref Arch – Enterprise Services

- State-wide scope
- Recommended mandatory usage
- May be COTS/Packaged Application
  - HR, Admin, Financial, Asset Management
  - Enterprise Search
  - RSS (Subscription/Alerts/FAQs/News)

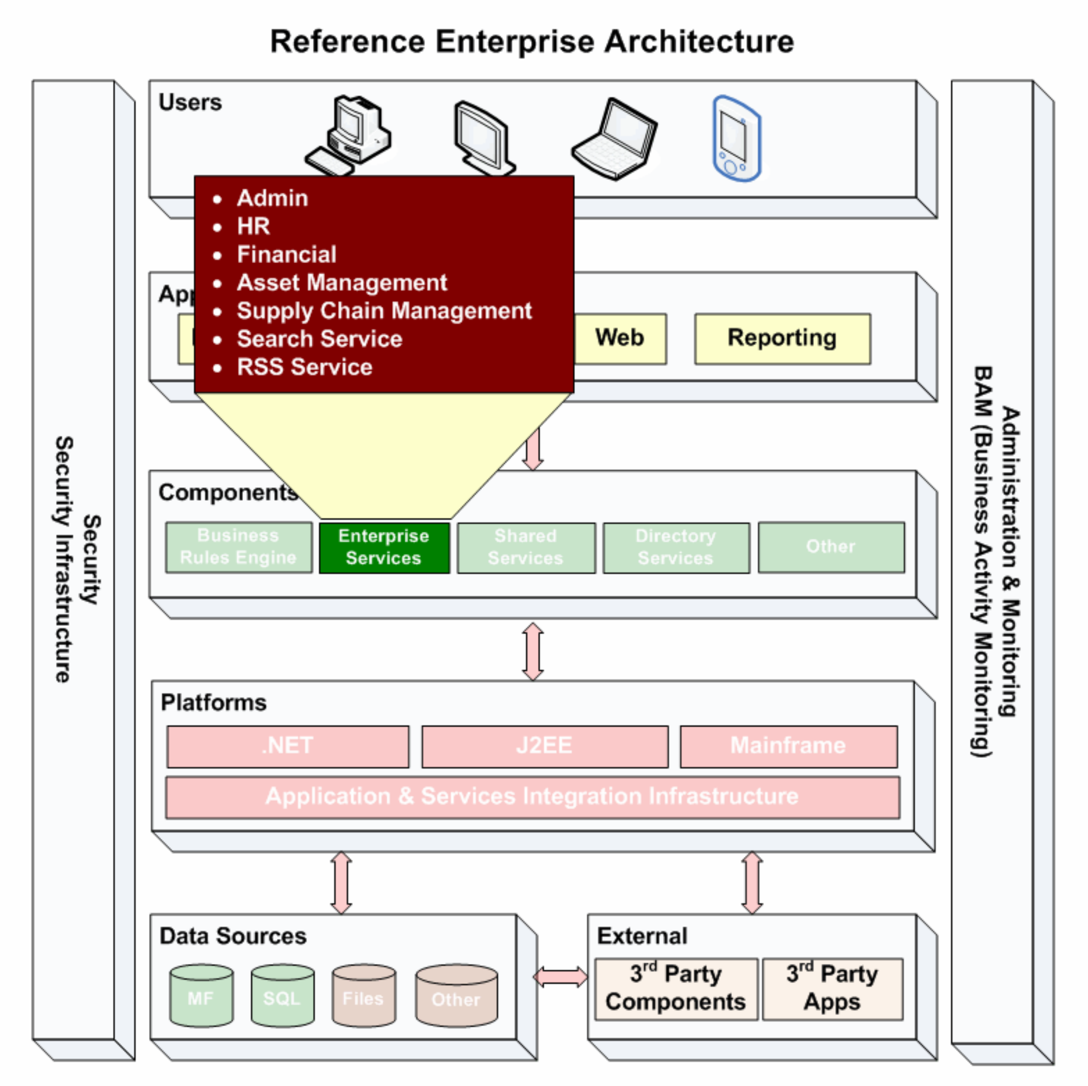
Ref Arch – Shared Services

- Community of Interest scope
- Consumed by applications
- Shared services – single development org
  - Address Verification Service
- Shared services – multiple dev organizations
  - GIS Web Services
- Composite Shared Services
  - Payment Service

Reference Architecture


Reference Enterprise Architecture

Ref Arch - Enterprise Services



Reference Enterprise Architecture

Users

- Admin
- HR
- Financial
- Asset Management
- Supply Chain Management
- Search Service
- RSS Service

App

Web

Reporting

Components

Business Rules Engine

Enterprise Services

Shared Services

Directory Services

Other

Platforms

.NET

J2EE

Mainframe

Application & Services Integration Infrastructure

Data Sources

MF

SQL

Files

Other

External

3rd Party Components

3rd Party Apps

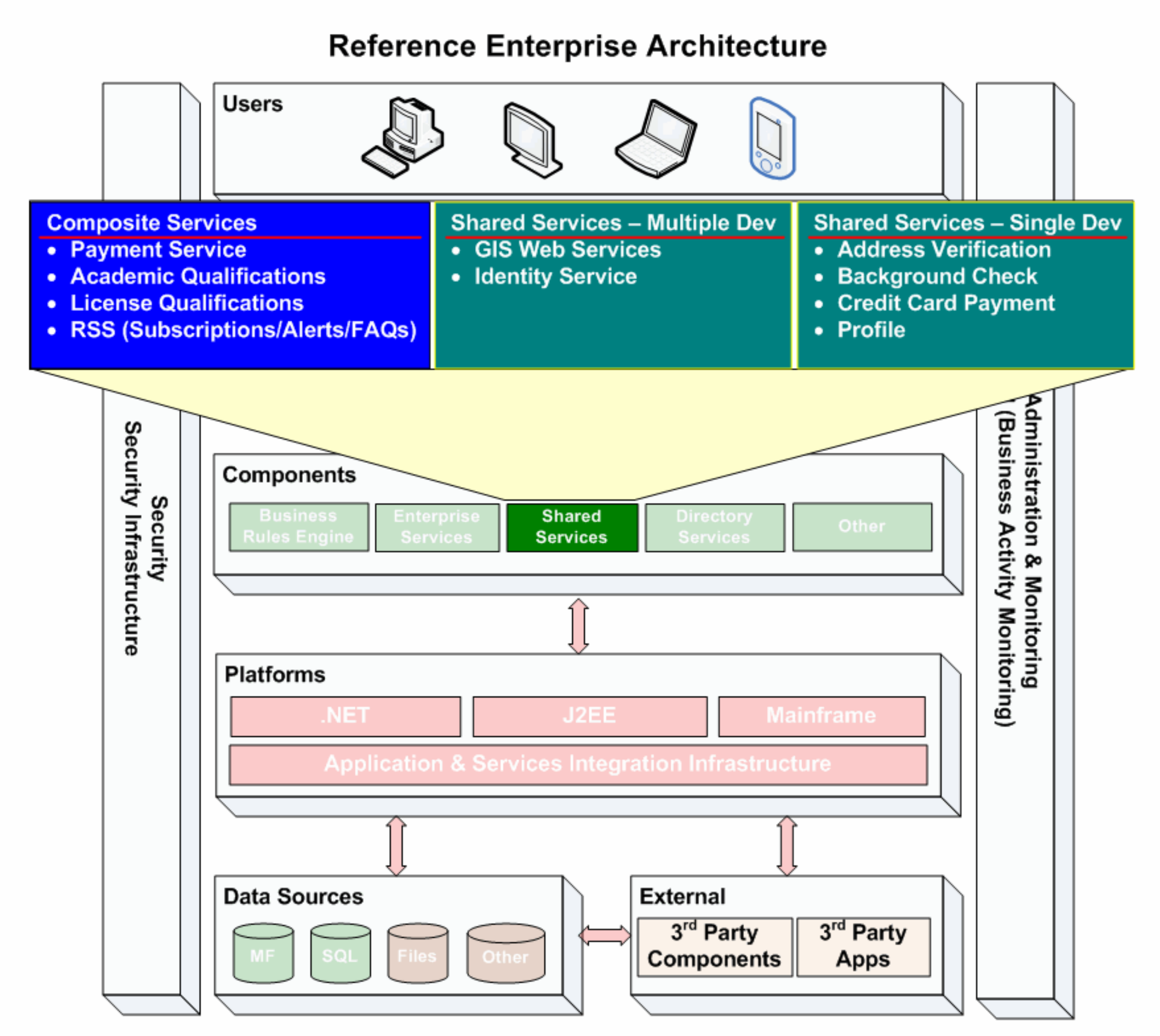
Security

Security Infrastructure

Administration & Monitoring

BAM (Business Activity Monitoring)

Ref Arch - Shared Services



Reference Enterprise Architecture

Users

Composite Services
- Payment Service
- Academic Qualifications
- License Qualifications
- RSS (Subscriptions/Alerts/FAQs)

Shared Services – Multiple Dev
- GIS Web Services
- Identity Service

Shared Services – Single Dev
- Address Verification
- Background Check
- Credit Card Payment
- Profile

Components

Business Rules Engine | Enterprise Services | Shared Services | Directory Services | Other

Platforms

.NET | J2EE | Mainframe

Application & Services Integration Infrastructure

Data Sources

MF | SQL | Files | Other

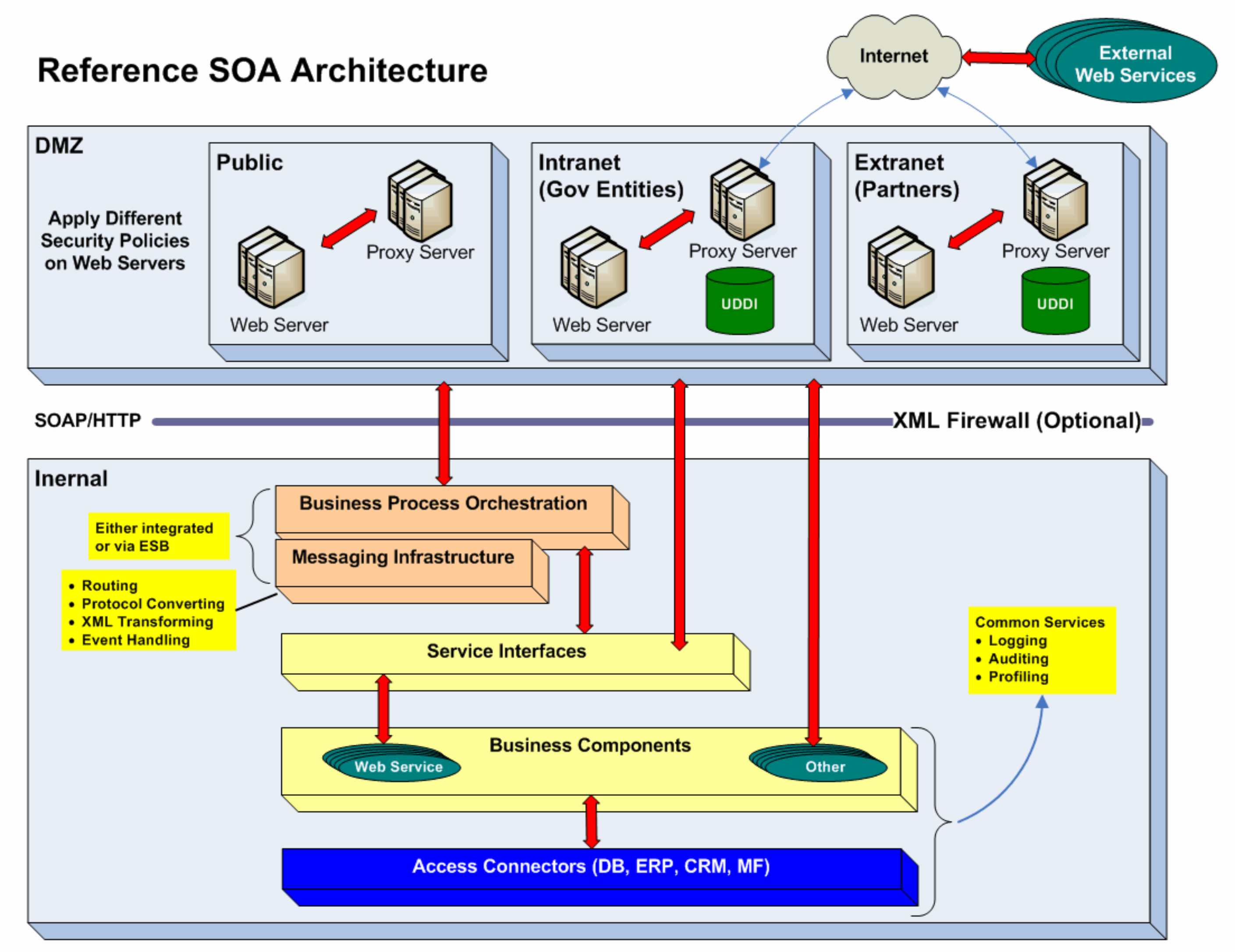
External

3rd Party Components | 3rd Party Apps

Security
Security Infrastructure

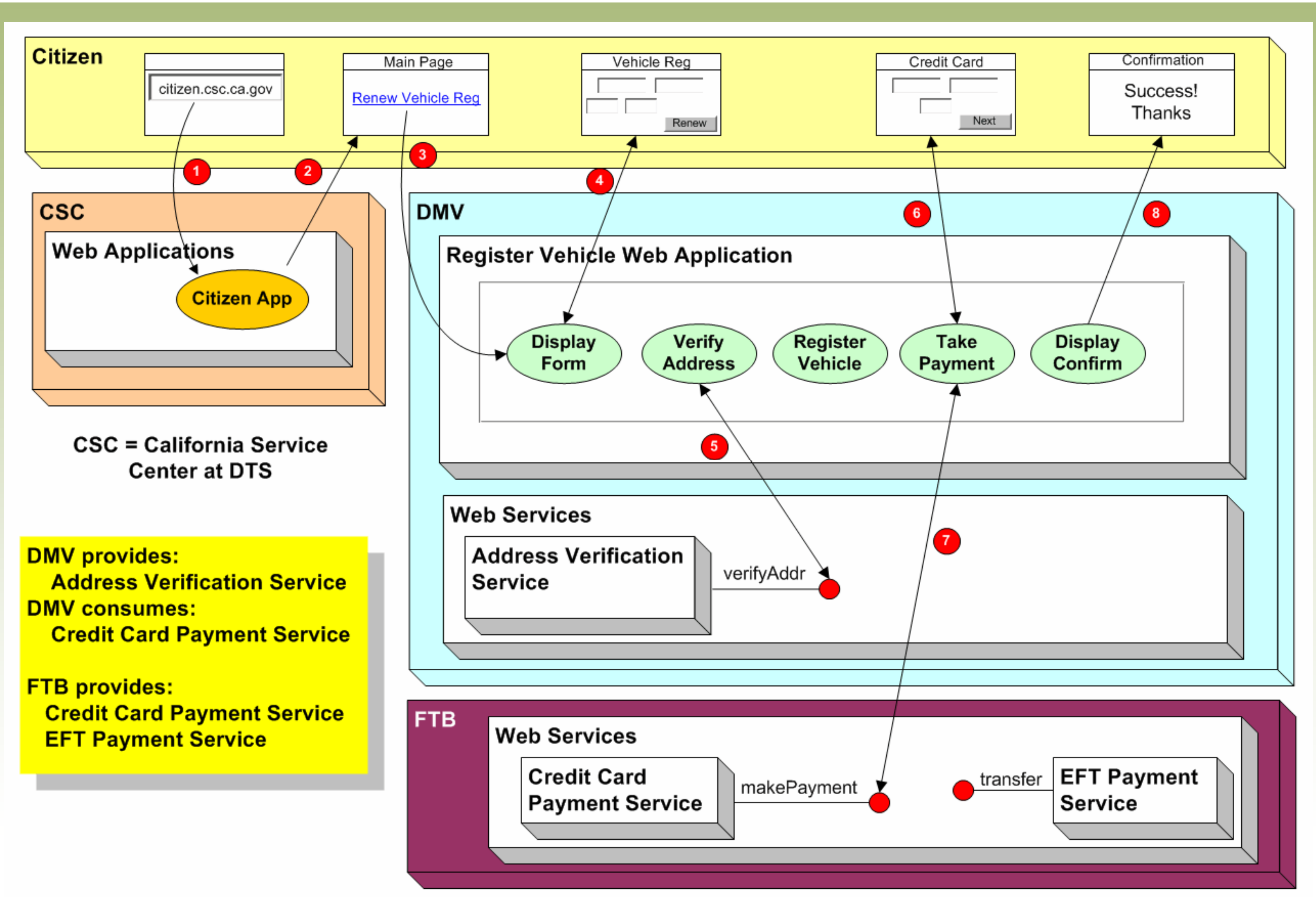
Administration & Monitoring
(Business Activity Monitoring)

Reference Architecture



Some Examples

Web App Consuming WS

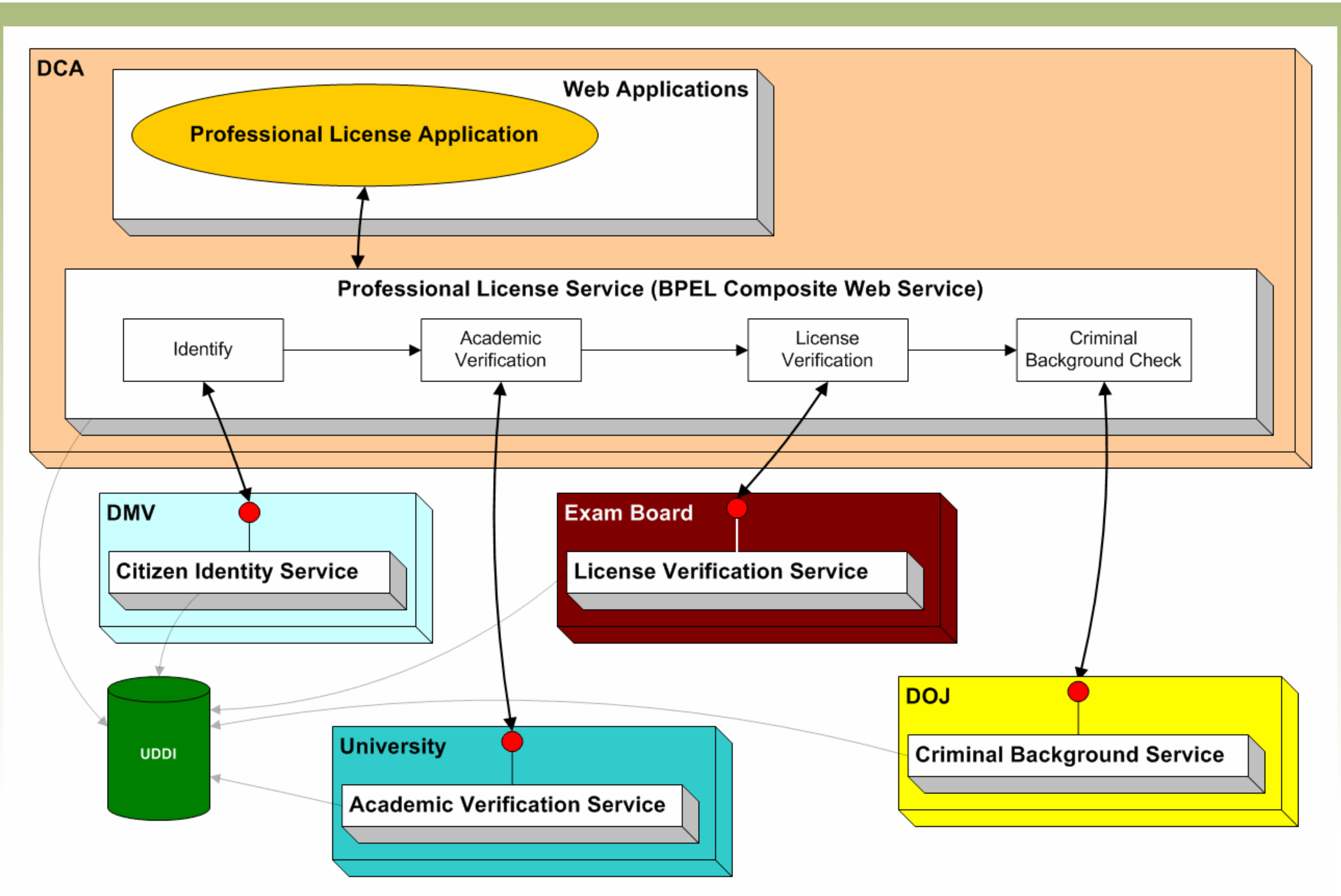


CSC = California Service Center at DTS

DMV provides:
Address Verification Service
DMV consumes:
Credit Card Payment Service

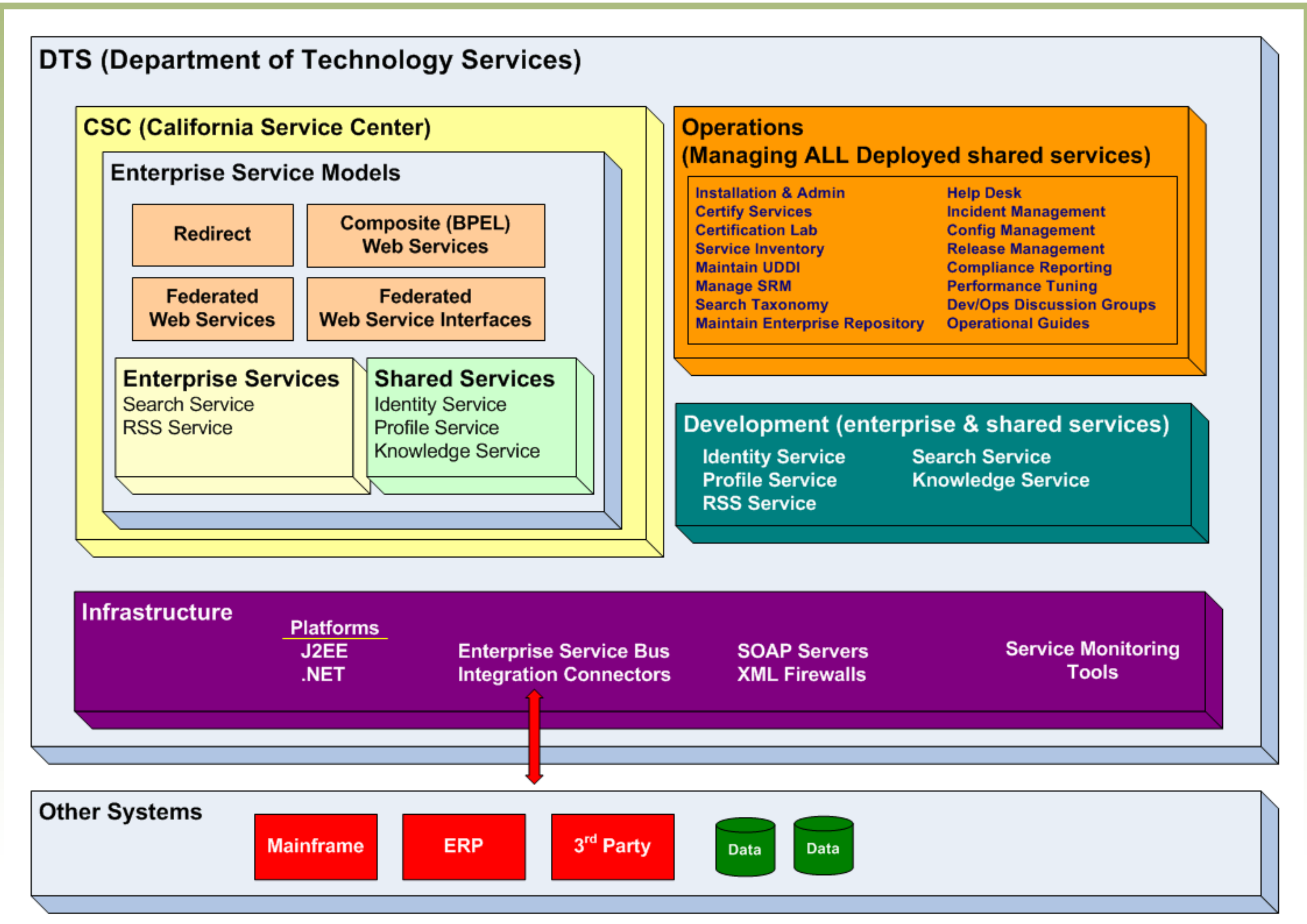
FTB provides:
Credit Card Payment Service
EFT Payment Service

Composite Web Service


DCA
Web Applications
Professional License Application
Professional License Service (BPEL Composite Web Service)
Identify
Academic Verification
License Verification
Criminal Background Check
DMV
Citizen Identity Service
Exam Board
License Verification Service
UDDI
University
Academic Verification Service
DOJ
Criminal Background Service

California Enterprise Architecture Program

DTS Example


DTS (Department of Technology Services)
CSC (California Service Center)
Enterprise Service Models
Redirect
Composite (BPEL) Web Services
Federated Web Services
Federated Web Service Interfaces
Enterprise Services
Search Service
RSS Service
Shared Services
Identity Service
Profile Service
Knowledge Service
Operations
(Managing ALL Deployed shared services)
Installation & Admin
Certify Services
Certification Lab
Service Inventory
Maintain UDDI
Manage SRM
Search Taxonomy
Maintain Enterprise Repository
Help Desk
Incident Management
Config Management
Release Management
Compliance Reporting
Performance Tuning
Dev/Ops Discussion Groups
Operational Guides
Development (enterprise & shared services)
Identity Service
Profile Service
RSS Service
Search Service
Knowledge Service
Infrastructure
Platforms
J2EE
.NET
Enterprise Service Bus
Integration Connectors
SOAP Servers
XML Firewalls
Service Monitoring Tools
Other Systems
Mainframe
ERP
3rd Party
Data
Data

Transition Strategies

- Web Services interface on existing apps
  - Current Mainframe apps to Web Services
    - For example: Software AG EntireX
  - Current Java apps to Web Services
  - Current .Net apps to Web Services
- Rewrite/Create new apps
  - Retire existing app, rewrite in Java or .Net
  - Use SOA (web services-based architecture)
  - Opportunity to re-engineer data model
  - Opportunity to re-engineer business processes, business rules, business logic

Web Services Security

Standards - Security

- WS-Security
  - Top level web services security management
- WS-Trust
  - Framework for security tokens
- WS-Provisioning
  - Federate identity management
- WS-Federation
  - Broker trust relationships in federated environment
- WS-Addressing
  - Specify Identification and addressing information
- WS-Authorization
  - Manage authorization data and policies
- WS-Policy
- WS-Privacy
- SAML (Security Assertion Markup Language)
- STS (Secure Token Service)

SOA Security

- Organizations
  - W3C, IETF, OASIS
- XML Security for Web Services (W3C)
  - XML Signatures (XMLDS)
    - Defines the processing rules and syntax to wrap message integrity, message authentication, and user authentication data inside an XML format.
  - XML Encryption
    - Encrypted data is wrapped inside XML tags
- WS-Security (OASIS)
  - Defines the mechanism for including integrity, confidentiality, and single message authentication features within a SOAP message
  - Uses XML Signatures and XML Encryption

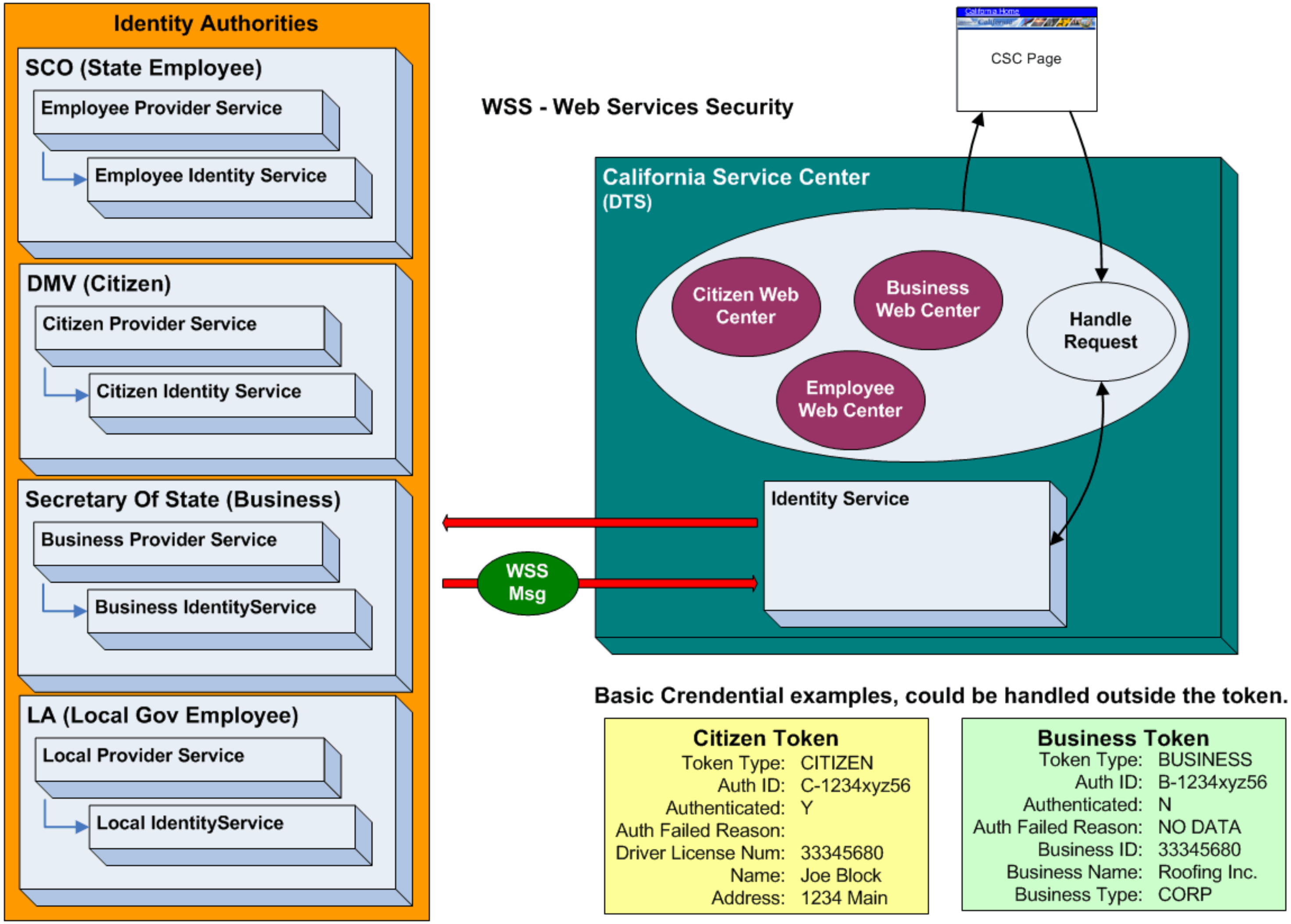
SOA Security

- SAML – Security Assertion Markup Language
  - Standard protocol for sharing security information
- XACML (eXtensible Access Control Markup Language
  - Defines a vocabulary to specify subjects, rights, objects, and conditions
- Digital Signatures
  - Keys used to produce and verify digital signatures

SOA Security

- Certificates
  - A data structure that holds the identification and public key of the certificate owner

Security - Identification



Identity Authorities

SCO (State Employee)

Employee Provider Service

Employee Identity Service

DMV (Citizen)

Citizen Provider Service

Citizen Identity Service

Secretary Of State (Business)

Business Provider Service

Business IdentityService

LA (Local Gov Employee)

Local Provider Service

Local IdentityService

WSS - Web Services Security

CSC Page

California Service Center
(DTS)

Citizen Web Center

Business Web Center

Handle Request

Employee Web Center

Identity Service

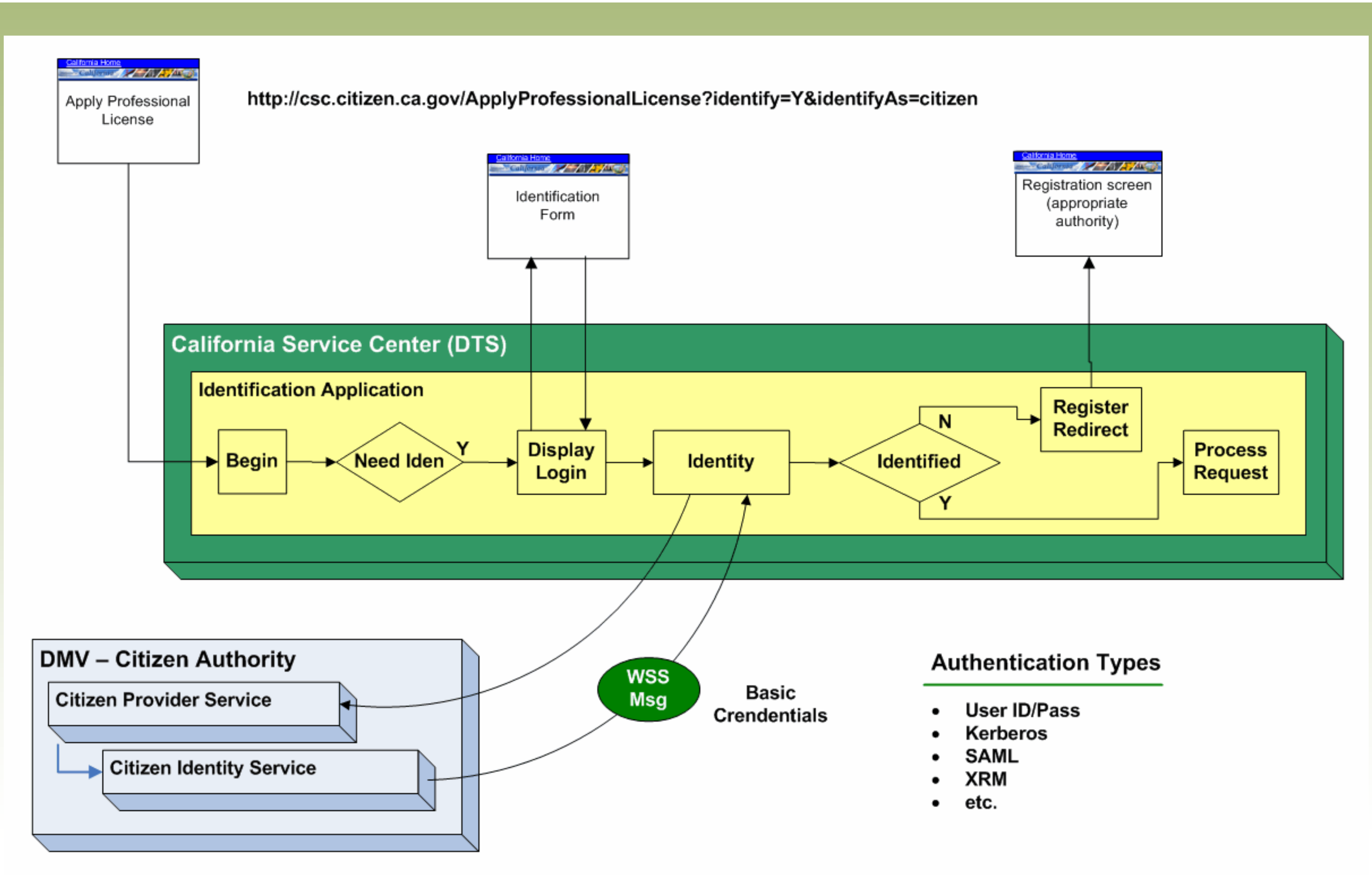
WSS Msg

Basic Crendential examples, could be handled outside the token.

Citizen Token	
Token Type:	CITIZEN
Auth ID:	C-1234xyz56
Authenticated:	Y
Auth Failed Reason:	
Driver License Num:	33345680
Name:	Joe Block
Address:	1234 Main

Business Token	
Token Type:	BUSINESS
Auth ID:	B-1234xyz56
Authenticated:	N
Auth Failed Reason:	NO DATA
Business ID:	33345680
Business Name:	Roofing Inc.
Business Type:	CORP

Security – Citizen Service



Apply Professional License

http://csc.citizen.ca.gov/ApplyProfessionalLicense?identify=Y&identifyAs=citizen

Identification Form

Registration screen (appropriate authority)

California Service Center (DTS)

Identification Application

Begin

Need Iden

Y

Display Login

Identity

Identified

N

Y

Register Redirect

Process Request

DMV – Citizen Authority

Citizen Provider Service

Citizen Identity Service

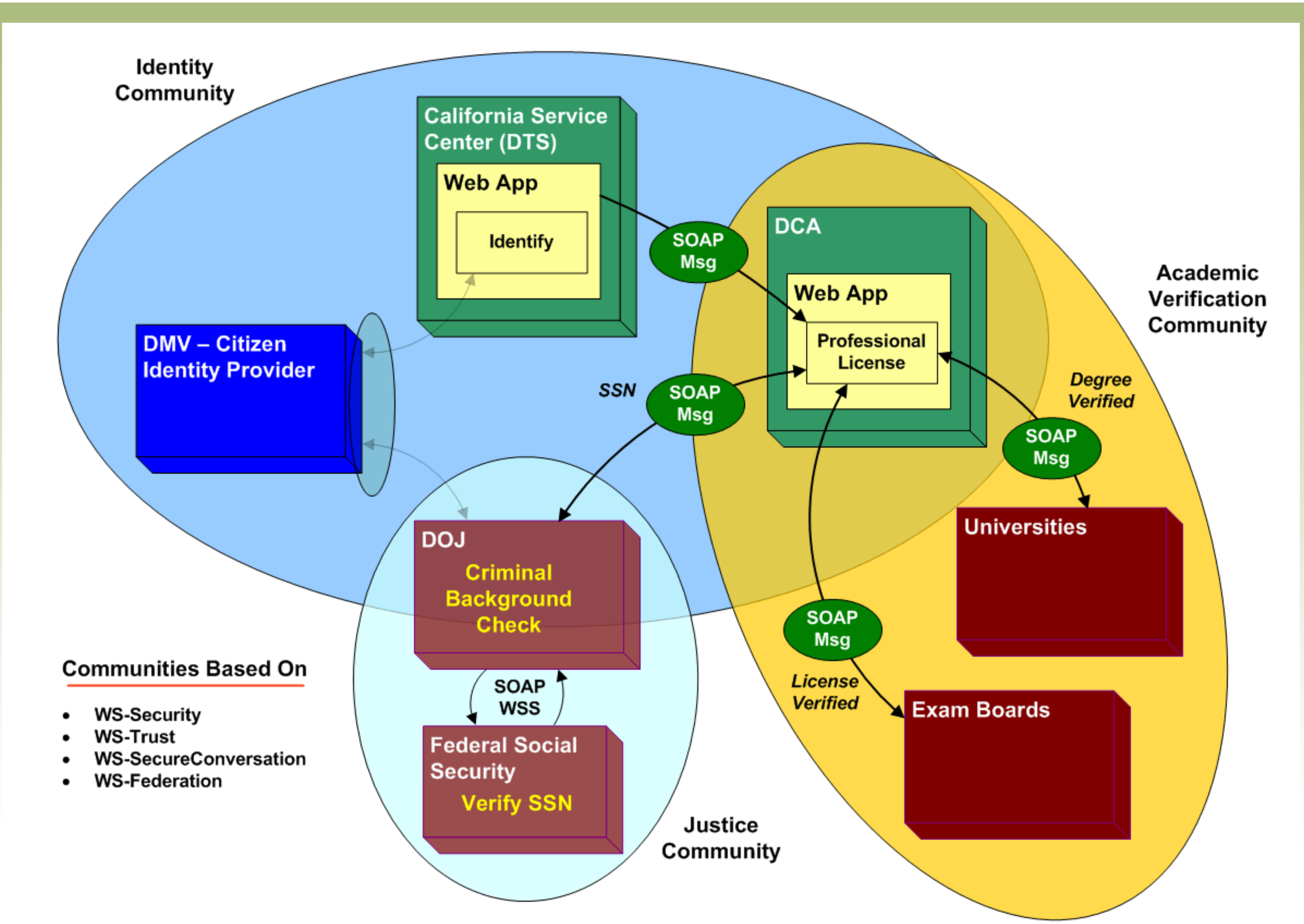
WSS Msg

Basic Crendentials

Authentication Types

- User ID/Pass
- Kerberos
- SAML
- XRM
- etc.

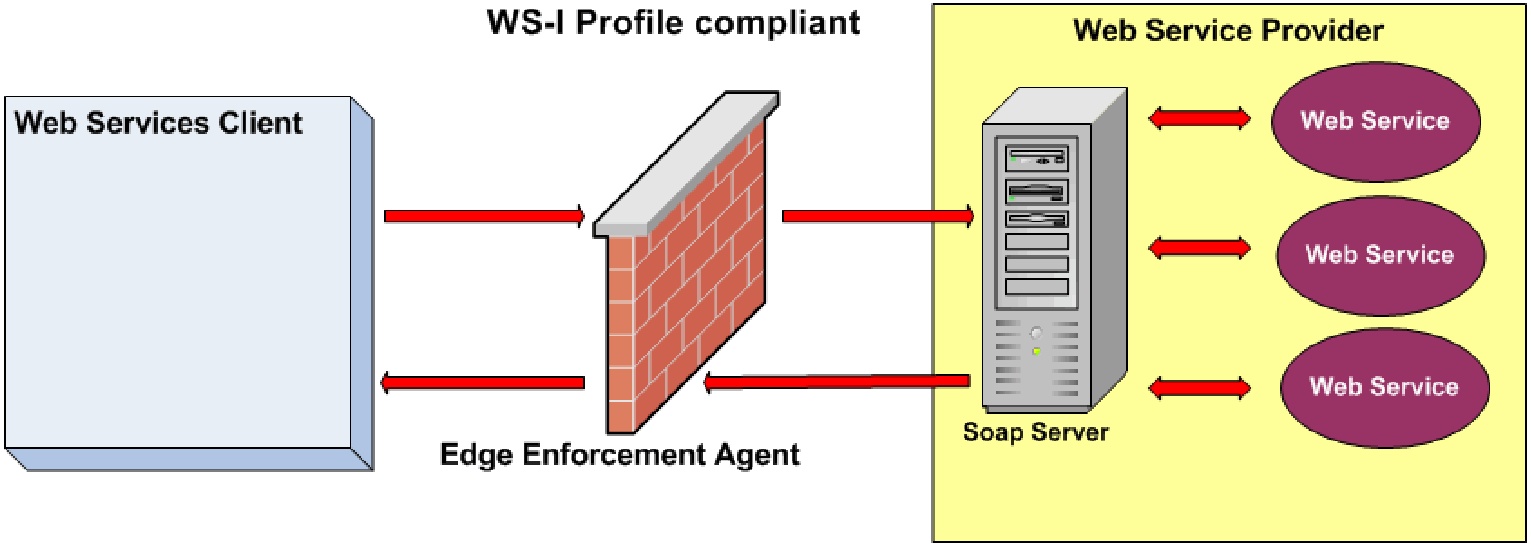
Security – Circle of Trusts



Communities Based On

- WS-Security
- WS-Trust
- WS-SecureConversation
- WS-Federation

Security – XML Firewalls



The Edge agent must look inside the SOAP/WSS messages and enforce security access to the SOAP server.

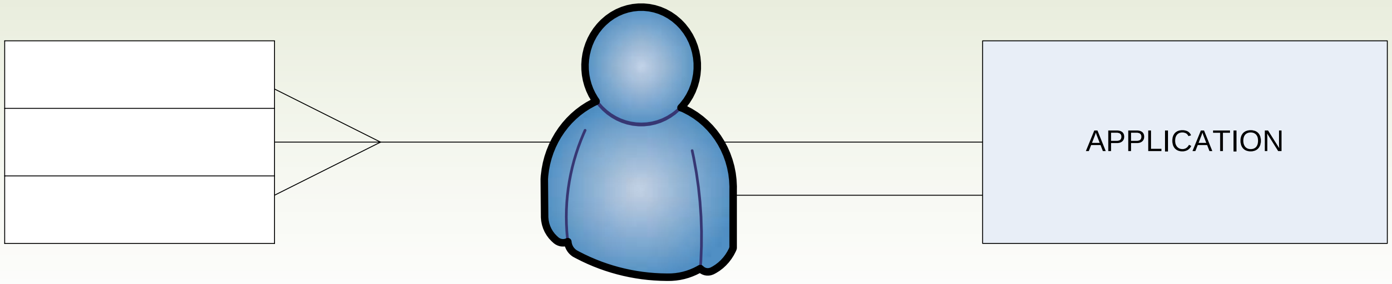
Identity Management and Authentication

Sjon Woodlyn

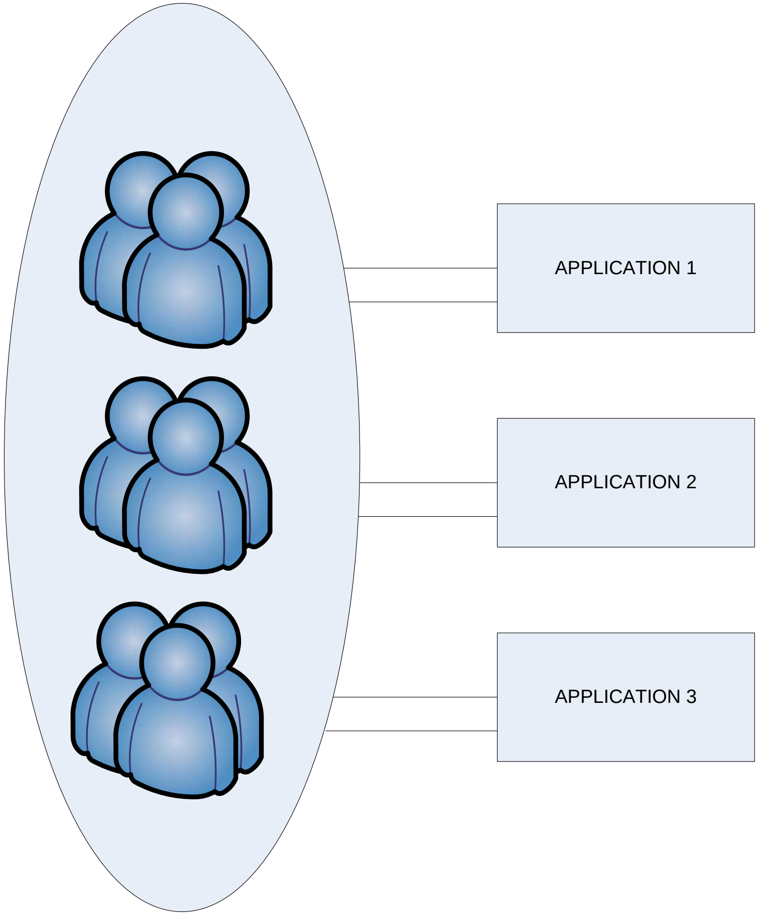
Identity Today

- Identity silos
- Duplicate processes
- Duplication of constituent data
- Inconsistent identity practices

- Interoperability disconnects
- Tight coupling
- No governance in Identity space



Identity Chaos

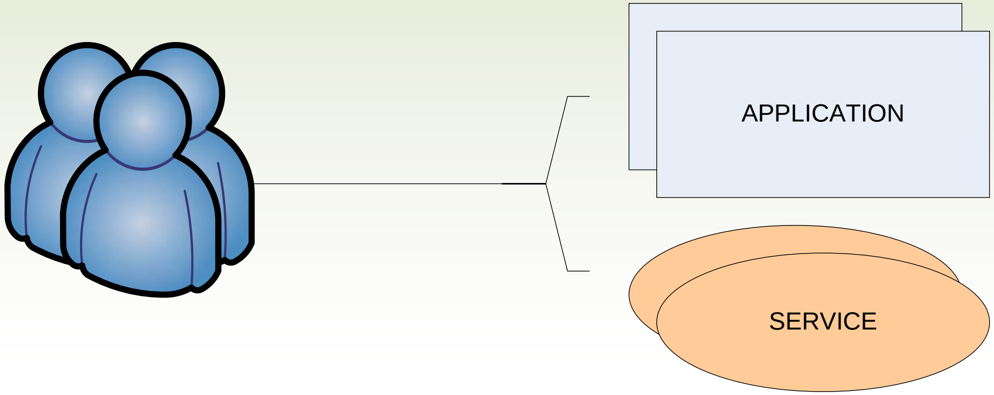


- Single Population
- Duplicated at each system
- Higher management/maintenance costs
- Inefficient design

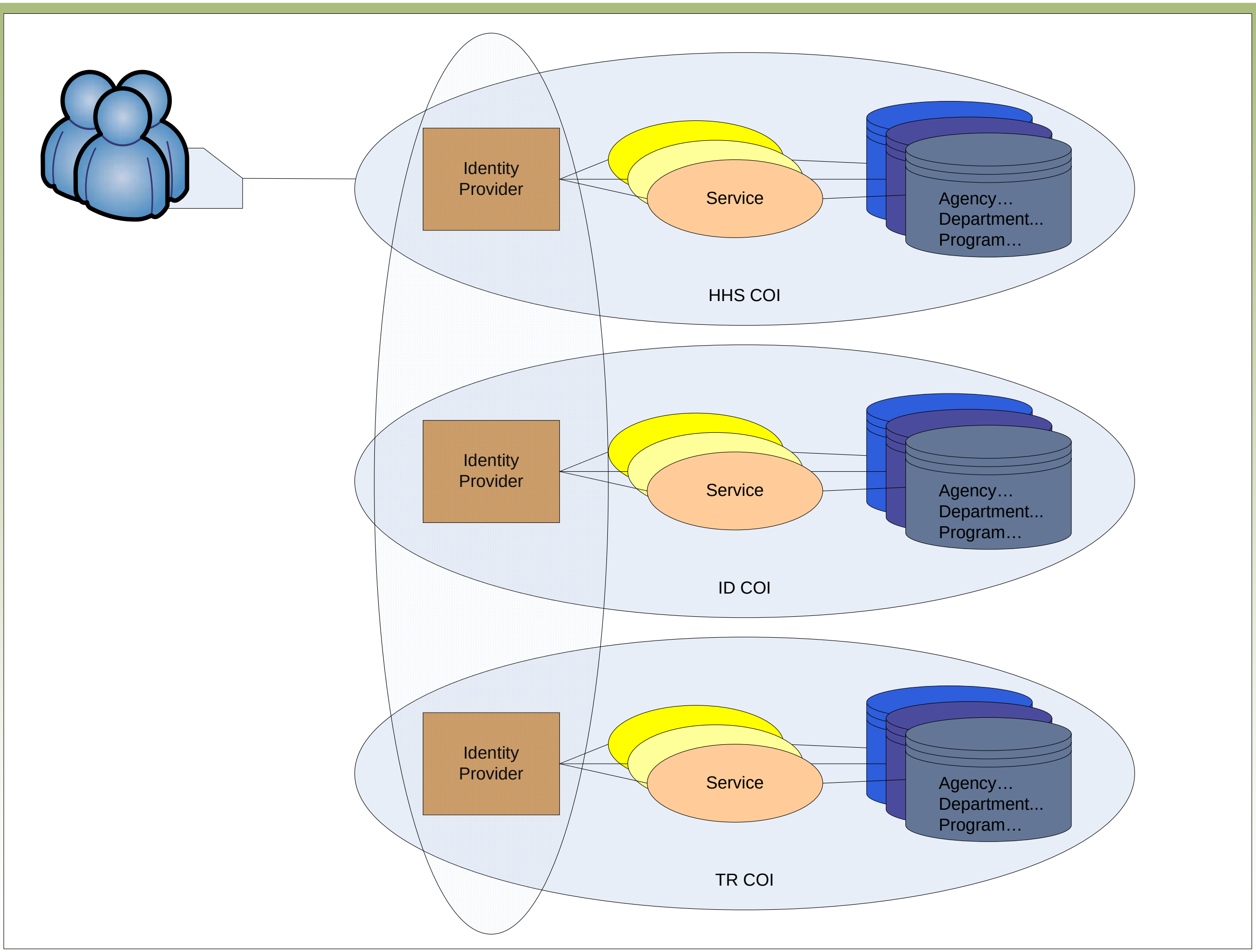
Identity Tomorrow

- De-coupled from the application
  - Identity component
  - Authentication component
- Service Oriented Approach

- Managing required elements
- Consistent identity practices
- Consistent security



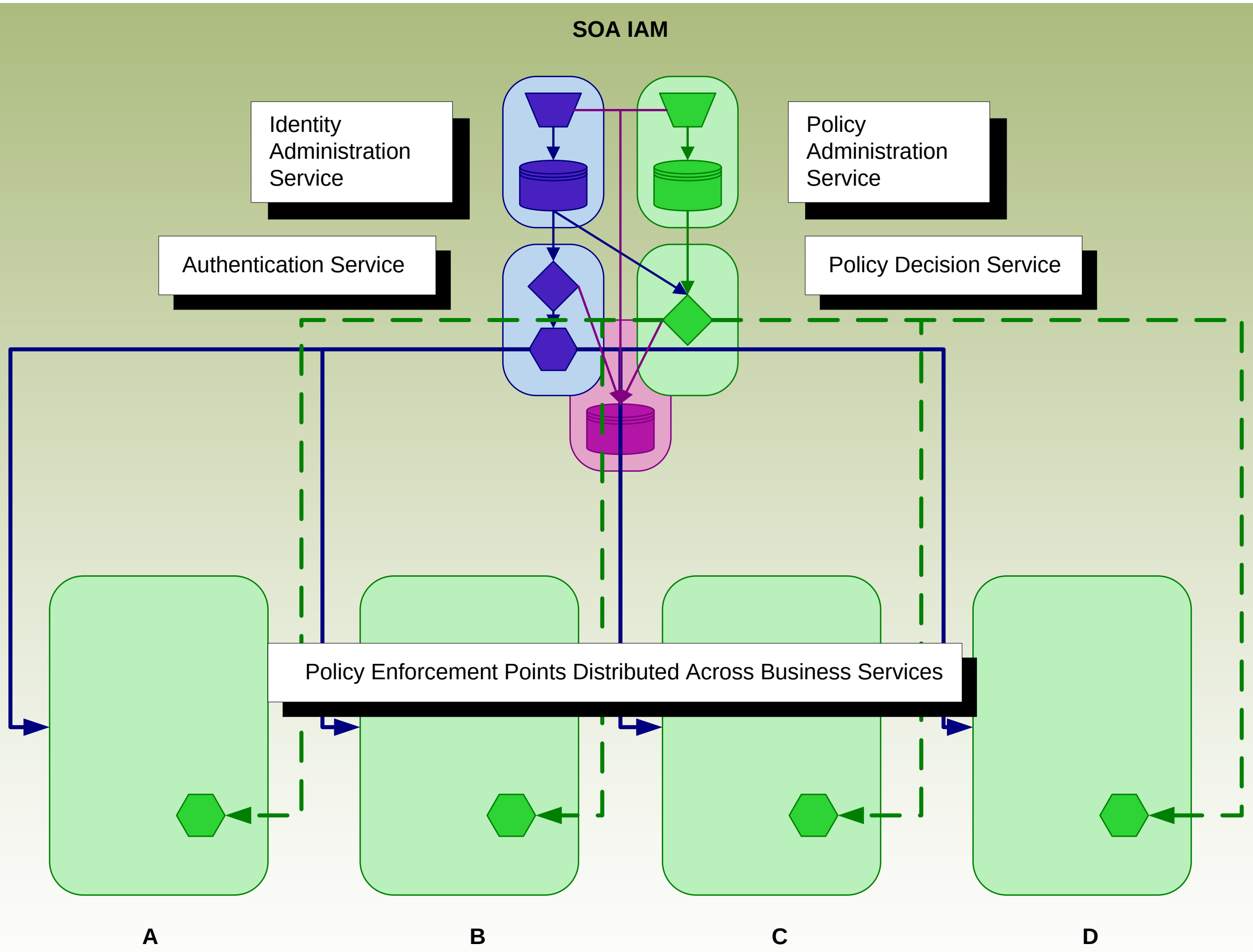
In Federation



Why Now?

- SOA enables federated identity and federation
- Standards maturation provides the ability to communicate in common terms
- Products are increasingly being made more interoperable (standards-based)
- Technology allows us to re-engineer the identity process in the Internet/web space
- Identity is in disarray

Identity and SOA



SOA IAM
Identity Administration Service
Policy Administration Service
Authentication Service
Policy Decision Service
Policy Enforcement Points Distributed Across Business Services
A
B
C
D

Source: Gartner – A Functional Model Aids Understanding of Identity and Access Management Tools

The Benefits

- Offloading business processes
- Consistent:
  - Policy across COI
  - Security
  - Identity practices
  - Audit/trace capabilities and practices
  - Accountability
- Administration
  - Fewer identities to directly manage
    - Role-based assignment of resources
- Reusable components
- Governance in Identity space

The Risks

- Security
  - Intrusion, auditing, internal threat, etc.
- Federated identity issues
- Privacy
  - Policy
  - Opt-in
- Lack of mature implementations
- Funding cycle – FSR review & development
- Public perception
- Culture shock
- Governance in identity space

How?

- Stepwise approach
- Assess climate (not technology)
  - What existing partnerships could facilitate?
  - What business obstacles exist?
- Define standards to-be
  - Federation
  - Communities of Interest
    - Based on federation standards
    - Roles
  - Security
  - Interactions
- The right people?

Possible COI delineation

Business Reference Model: Federal and State Comparison [Draft]

FEA	VA	CA	CA LOB
Services to Citizens Business Area	Services to Citizens Business Area	Potential Services to Citizens Business Area	Examples of CA LOB Functions
Law Enforcement	Law Enforcement	Law Enforcement	Citizen protection/ crime prevention
Education	Education	Education	Elementary/higher education
Health	Health	Health	Healthcare, medical services
Transportation	Transportation	Transportation	Ground, water, and air transport
Disaster Management	Emergency and Disaster Management	Emergency and Disaster Management	Disaster response, planning, and prediction
Economic Development	Economic Development	Economic Development	Industry and business improvement
Workforce Management	Workforce Management	Workforce Management	Worker safety and training

Next Steps

- SOA / Identity Work Groups
- Vet – Formalize through ITC
- Transition Planning – How to make it real

CEAP Contacts

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- Sjon Woodlyn (Identity)
  - Sjon.Woodlyn@ceap.ca.gov (916) 657-7581
- SOA Powerpoint

http://www.cio.ca.gov/ITCouncil/Committees/PDFs/SOA_Presentation_2006-02-09.pdf

Questions